SEMESTER I

U23EN101 **ENGLISH FOR ENGINEERS** **Category: HSMC**
SDG: 4 **(Common to all Branches)**

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. To enable learners of engineering and technology to develop their basic communication skills in English.
2. To acquire, command in both the respective skills (listening and reading) and the productive skills (writing and speaking) of the English language.
3. To understand the key concepts of values, life skills and business communication and motivate students to look within and create a better version of themselves.
4. To focus on the development of basic fluency in English, usage of vocabulary in the technical field, and strengthening reading and official written communication skills.
5. To use language efficiently in expressing their opinions via various media.

UNIT 1 INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION 9

Listening– listening to Audio/video(formal&informal);Telephonicconversation (Activity) Speaking-SelfIntroduction;Introducingafriend (Activity);Conversation-politenessstrategies; Reading - Reading brochures (technical context), telephone messages / social media messagesrelevanttotechnicalcontexts-Writing-Writingonself, Writing Definition; Jumbled sentence Grammar – Simple present tense, Present continuous, Present perfect, Present perfect continuous; Question types: Wh/ Yes or No/ and Tags; Word formation, One-wordsubstitution.

UNIT 2 NARRATION AND SUMMATION 9

Listening-Listeningto the podcast, anecdotes/stories/event narration; documentaries andinterviews withcelebrities (Activity). Speaking-Narratingpersonalexperiences/events;interviewingacelebrity (Activity). Reading-Readingbiographies,travelogues,newspaperreports, Writing-Guidedwriting-Paragraphwriting,ShortReportonanevent(fieldtripetc.) - Grammar– Simple past tense, Past continuous, Past perfect, Past perfect continuous; Subject-VerbAgreement;Prepositions, Wordforms(prefixes&suffixes); Error Correction.

UNIT 3 DESCRIPTION OF PROCESS/PRODUCT 9

Listening – Listening to specific audio tracks (Activity) Speaking – Picture description; giving instruction to use the product; presenting a product; Role play (Activity) -Reading – Reading advertisements, gadget reviews; finding key information from a given text- Writing - Instructions; Process description; Grammar - Simple future tense, Future continuous, Future perfect, Future perfect continuous; Imperatives; Adjectives; Degrees of comparison; Compound Words.

UNIT 4 CLASSIFICATION AND RECOMMENDATIONS 9

Listening – watching videos/ documentaries and responding to the questions based on them, Scientific lectures; and educational videos. Speaking – Small Talk; Mini presentations (Activity) -Reading – Journal reports, predicting content of reading habits, Reading articles (Activity)- Writing –Memos to colleagues or friends; Opinion Blogs; Grammar – Articles; Pronouns - Possessive & Relative pronouns, Cause and Effect.

UNIT 5 EXPRESSION 9

Listening – Listening to different accent, Listening to speeches or presentation- Speaking – Debates and Expressing opinions through Simulations, exchanging personal information - (Activity)- Reading – Reading editorials; Poster making (Activity)- Writing – Creative Writing, Checklist- Grammar –Punctuation; Compound Nouns, Homonyms; and Homophones, Simple, Compound & Complex Sentences.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Listenandcomprehendcomplexacademictexts.

CO2: Understand the denotative and connotative meanings of technical texts.

CO3: Identify definitions, descriptions, narrations and essays on various topics.

CO4: Apply different methods of integration in solving practical problems.

CO5: Expresstheiropinionseffectivelyinbothoralandwrittenmediumofcommunication.

TEXT BOOKS:

1. EnglishforEngineers&TechnologistsOrientBlackswanPrivateLtd.DepartmentofEnglish,Anna University(2020edition).

2.EnglishforScience&TechnologyCambridgeUniversityPress,2021. AuthoredbyDr.VeenaSelvam,Dr.SujathaPriyadarshini,Dr.DeepaMaryFrancis, Dr.KN.Shoba andDr.LourdesJoevani,DepartmentofEnglish,AnnaUniversity.

REFERENCES:

1. Technical Communication – Principles and Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.

2. ACourseBookonTechnicalEnglish byLakshmiNarayanan,ScitechPublications(India)Pvt.Ltd.

3.English forTechnicalCommunication (with CD) byAyshaViswamohan,Mc-grawHillEducation,ISBN:0070264244

4. EffectiveCommunicationSkill,KulbhusanKumar,RSSalaria,KhannaPublishingHouse.

5. LearningtoCommunicate–Dr.V.Chellammal,AlliedPublishingHouse,NewDelhi,2003.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	-	-	-	-	-	1	1	-	3	1	-	2	-	-	-
CO2	-	-	-	-	-	1	1	-	3	-	-	2	-	-	-
CO3	-	-	-	-	-	1	1	-	3	2	-	3	-	-	-
CO4	-	-	-	-	-	1	2	-	3	1	-	2	-	-	-
CO5	-	-	-	-	-	1	2	-	3	2	-	3	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23MA101	CALCULUS AND DIFFERENTIAL EQUATIONS	Category: BSC			
SDG: 4	(Common to all Branches)	L	T	P	C
		3	1	0	4

COURSE OBJECTIVE:

1. To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
2. To familiarize the students with differential calculus.
3. To enlighten the students with functions of several variables. This is needed in many branches of engineering.
4. To make the students acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
5. To acquaint the students with mathematical tools needed in evaluating multiple integrals and their applications.

UNIT 1 MATRICES 9+3

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (without proof) – Cayley – Hamilton theorem (Statement and applications only) - Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Nature of Quadratic forms - Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT 2 DIFFERENTIAL CALCULUS 9 + 3

Representation of functions - Limit of a function - Continuity - Derivatives -Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications: Maxima and Minima of functions of one variable.

UNIT 3 MULTIVARIABLE CALCULUS 9 + 3

Functions of two variables – Partial derivatives – Total differential – Taylor's series for functions of two variables – Jacobian's – Constrained maxima and minima – Lagrange's multiplier and its applications

UNIT 4 ORDINARY DIFFERENTIAL EQUATIONS OF SECOND ORDER 9 + 3

Linear differential equations of second order with constant coefficients. Linear differential Equations of second order with variable coefficients: Cauchy's linear differential equation - Method of variation of parameters for second order differential equations

UNIT 5 MULTIPLE INTEGRALS 9 + 3

Double integration with constant and variable limits - Region of integration - Area as double integral in Cartesian coordinates. Triple integral in Cartesian coordinates. Application of integration – Volume of Solids

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able to:

CO1: Comprehend the concepts of Eigen values, Eigen vectors, limits, continuity, functions of several variables, double integration and region of integration for solving complex problems.

CO2: Use rules of differentiation to solve maxima and minima problems.

CO3: Apply various techniques in solving ordinary and partial differential equations for practical applications.

CO4: Apply differential and integral calculus tools in modeling problems.

CO5: Evaluate integrals to compute area, volume and other practical problems.

TEXT BOOKS:

1. Grewal.B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 44th Edition 2018.
2. James Stewart, "Calculus : Early Transcendentals", Cengage Learning, 8th Edition, New Delhi,2015.
3. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New delhi,2016.

REFERENCES:

1. Bali. N., Goyal. M. and Watkins. C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009
2. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New delhi,2016
3. Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2016
4. Narayanan. S. and Manicavachagom Pillai. T. K., “Calculus" Volume I and II, S.Viswanathan Publishers Pvt. Ltd., Chennai, 2009.
5. Jain. R.K. and Iyengar. S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, 5th Edition, 2016.
6. Srimantha Pal and Bhunia. S.C, " Engineering Mathematics " Oxford University Press, 2015

CO’s-PO’s & PSO’s MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO 1	3	3	3	1	1	3	-	-	-	-	-	-	-	-	-
CO 2	3	3	1	-	-	3	-	-	-	-	-	-	-	-	-
CO 3	3	3	2	-	1	3	-	-	-	-	-	-	-	-	-
CO 4	3	3	3	-	-	3	-	-	-	-	-	-	-	-	-
CO 5	3	3	2	1	-	3	-	-	-	-	-	-	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high “-“- no correlation

U23PH101 **ENGINEERING PHYSICS** **Category: BSC**
SDG: 4

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. Understand the basics of Properties of Matter and apply them to Engineering.
2. Explore the applications of Lasers and Fiber optics in engineering contexts.
3. Apply principles of Ultrasonics and Thermal Physics to Engineering challenges.
4. Grasp foundational Quantum Physics concepts and their modern applications.
5. Analyze Crystal systems and their structures in Engineering and Technology.

UNIT 1 PROPERTIES OF MATTER 9

Elasticity – Stress-strain diagram and its uses - Factors affecting elastic modulus – Torsional stress and deformations –Torsion pendulum: theory and experiment - Bending of beams - Bending moment – Cantilever: theory and experiment – Uniform and non-uniform bending: theory and experiment - I-shaped girders - Applications. – Basic Solved Problems.

UNIT 2 LASER AND FIBER OPTICS 9

Introduction – Principle of Spontaneous emission and stimulated emission. Population inversion, pumping- Einstein's A and B coefficients: derivation. Types of lasers – Nd-YAG, CO_2- Industrial Applications of Lasers –Fiber Optics: Principle and propagation of light – Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) – Temperature and displacement sensors.

UNIT 3 ULTRASONICS AND THERMAL PHYSICS 9

Introduction – Piezoelectric effect - piezoelectric generator - Velocity measurement – Acoustic grating – Ultrasonic Medical applications - Introduction to heat - Transfer of heat energy :Thermal conduction, convection and radiation –Thermal conductivity - Forbe's and Lee's disc method: theory and experiment – Applications: heat exchangers, refrigerators, ovens and solar water heaters.

UNIT 4 QUANTUM PHYSICS 9

Black body radiation – Planck's theory (derivation) – Deduction of Wien's displacement law and Rayleigh-Jeans' Law from Planck's theory – Compton effect :Theory and experimental verification – Matter waves – Schrödinger's wave equation: Time independent and time dependent equations – Physical significance of wave function – Particle in a one-dimensional box - Microscope: Scanning Tunnelling microscope.

UNIT 5 CRYSTAL PHYSICS 9

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – 'd' spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Diamond and graphite structures – Polymorphism and allotropy - Crystal defects – Point, line and surface defects- Burger vector.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Realize the fundamental engineering ideas of matter, optics, heat, sound, and quantum theory.

CO2: Demonstrate a solid understanding of fundamental matter properties, Laser and Fiber optics classification, Quantum concepts and apply them successfully to solve practical engineering problems.

CO3: Apply the elastic modulus theory, Fiber Optic Sensors, Ultrasonics and thermal applications to integrate knowledge and problem solve at an advanced level.

CO4: Categorize the Elastic moduli concepts, Fiber optic lasers and Crystal structures to implement in

Engineer problems in Material Science and electronics.

CO5: Analyze the foundational Quantum and Crystal Physics concepts to implement solutions for modern engineering problems.

TEXT BOOKS:

1. Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
2. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.
3. Pandey, B.K. &Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012

REFERENCES:

1. Halliday, D., Resnick, R. & Walker, J. "Principles of Physics". Wiley, 2015.
2. Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers". Cengage Learning, 2010.
3. Palanisamy P.K. Engineering Physics. SCITECH Publications, 2011.
4. Kittle,C,: Introduction to solid state Physics:, Wiley, 2005.
5. Mani P. Engineering Physics I. Dhanam Publications, 2011.
6. Senthilkumar G. Engineering Physics I. VRB Publishers, 2011.

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3	1	-	1	-	1	-	-	1	-	1	-	-	-
CO2	3	3	1	-	1	-	1	-	1	-	-	1	-	-	-
CO3	3	3	1	-	1	-	1	-	1	-	-	1	-	-	-
CO4	3	2	1	-	1	-	-	-	-	1	-	1	-	-	-
CO5	3	3	1	-	-	-	1	-	1	-	-	1	-	-	-

Correlation levels: **1 – low** **2 – medium** **3 – high** **"-"- no correlation**

U23CY101 **ENGINEERING CHEMISTRY** **Category: BSC**

SDG: 9

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. Learn boiler feed water requirements, and water treatment techniques.
2. To acquire knowledge about the preparation, properties and applications of polymers.
3. Understand the basic concepts of electrochemistry and its applications.
4. Learn corrosion control and protective techniques.
5. Acquire the knowledge about the fuels and properties of energy storage devices.

UNIT 1 WATER TECHNOLOGY 9

Introduction - Sources of water - Impurities in water - Types of water –Hardness of water - Expression of hardness - Units of hardness - Estimation of hardness of water by EDTA method - Disadvantages of using hard water - Boiler troubles - Scale and sludge - Softening of water - External treatment method - Demineralization process - Internal treatment process – Carbonate, Phosphate and Calgon conditioning - Desalination by reverse osmosis method.

UNIT 2 POLYMERS 9

Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Types: Addition, condensation and copolymerization and mechanism of Addition polymerization (Free Radical); Techniques of polymerization: Bulk, emulsion, solution and suspension. Preparation, properties and uses of Nylon (6,6 and 11) and Epoxy resin. Engineering application of plastics- PVC, PTFE and Bakelite. Types of compounding of plastics- Moulding, injection moulding.

UNIT 3 ELECTRO CHEMISTRY 9

Electrochemistry**:** Introduction - Cells - Representation of a galvanic cell - Reversible and irreversible cells - Electrode potential - Nernst equation - Reference electrode (Calomel electrode) - Standard hydrogen electrode - Glass electrode - Electrochemical series and its applications – Battery: Introduction, Types of batteries- alkaline battery- lead storage battery - H_2 -O_2 fuel cell- applications. Construction of solar cells and E-Vehicle.

UNIT 4 CORROSION AND ITS CONTROL 9

Introduction - Chemical corrosion and Wet corrosion - Galvanic and differential aeration (Pitting, Crevice and Pipeline) - Factors influencing rate of corrosion - Corrosion- causes- factors- corrosion control - material selection and design aspects - electrochemical protection – sacrificial anode method and impressed current cathodic method- Cathodic protection method.

UNIT 5 FUELS AND COMBUSTION 9

Introduction - Classification of fuels - Requirements of a good fuel – Combustion: Principle of combustion - Calorific value - Gross and net calorific values - Explosive range - Spontaneous ignition temperature. Fuels: Solid fuels - Coal and its varieties - Proximate analysis - Significance - Metallurgical coke - Otto-Hoffman byproduct method - Liquid fuel: Manufacture of synthetic petrol - Bergius method - Knocking - Octane number - Cetane number - Gaseous fuel: Liquefied petroleum gas (LPG), Compressed natural gas (CNG).

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Recall the concept about water technology, engineering polymers, electrodes, corrosion and combustion of fuels.

CO2: Understand the boiler problems and categorize the polymers.

CO3: Classify plastics, batteries, corrosion, and the calorific value of fuels.

CO4: Apply enough knowledge of contemporary water softening, polymerization, fuel cell, electrochemical protection, and fuel manufacturing procedures.

CO5: Analyze the hardness of water using the EDTA technique and characterization of coal.

TEXT BOOKS:

1. Jain P C and Monica Jain, “Engineering Chemistry”, 17th Edition, Dhanpat Rai Publishing Co., 2018.

2. Sivasankar B., “Engineering Chemistry”, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2017.

REFERENCES:

1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, “Textbook of nanoscience and nanotechnology”, Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2. O.G. Palanna, “Engineering Chemistry” McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. Friedrich Emich, “Engineering Chemistry”, Scientific International Pvt, Ltd, New Delhi, 2017.
4. Shikha Agarwal, “Engineering Chemistry-Fundamentals and Applications”, Cambridge University Press, Delhi, Second Edition, 2019.
5. R.D. Madan, “Modern Inorganic Chemistry”, S. Chand, New Delhi, 2012
6. S.S. Dara, “A Textbook of Engineering Chemistry”, S. Chand Publishing, 12th Edition, 2018.

CO’s-PO’s & PSO’s MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	-	-	2	-	-	2	-	-	-	-	1	-	-	-
CO2	3	-	-	2	2	-	2	-	-	-	-	2	-	-	-
CO3	3	-	-	2	2	-	2	-	-	-	-	2	-	-	-
CO4	3	-	-	2	3	-	2	-	-	-	-	3	-	-	-
CO5	3	-	-	2	3	-	2	-	-	-	-	3	-	-	-
CO6	3	-	-	2	2	-	2	-	-	-	-	2.2	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high “-“- no correlation

U23GE101 **ENGINEERING GRAPHICS** **Category: ESC**

SDG:8

L	T	P	C
2	0	3	4

COURSE OBJECTIVE:

1. Draw engineering curves of simple objects.
2. To Draw the orthographic projection of solids and section of solids.
3. Draw the development of surfaces.
4. Draw the isometric projections of simple solids.
5. Model a simple object using a CAD software.

CONCEPTS AND CONVENTIONS (Not for Examination) **2**

Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications — Size, layout and folding of drawing sheets - Lettering and dimensioning.

UNIT 1 **PLANE CURVES** **10**

Basic Geometrical constructions, Curves used in engineering practices: Conics -Construction of ellipse, parabola and hyperbola by eccentricity method - Construction of cycloid - Construction of involutes of circle - Drawing of tangents and normal to the above curves.

UNIT 2 **PROJECTION OF POINTS, LINES AND PLANES** **10**

Orthographic projection - principles - Principal planes - First angle projection -projection of points. Projection of straight lines - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces).

UNIT 3 **PROJECTION OF SOLIDS** **10**

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids by rotating object method.

UNIT 4 **PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES** **10**

Sectioning of solids in simple vertical position - obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids - Prisms, pyramids cylinders and cones.

UNIT 5 **ISOMETRIC PROJECTIONS** **10**

Principles of isometric projection - isometric scale - isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders and cones.

MODELING OF SIMPLE OBJECTS (Not for Examination) **8**

Practicing three-dimensional modeling of simple objects by CAD Software.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Remember the concept of C programming to understand the functional knowledge about operators and the keywords used.

CO2: Demonstrate C program for data types, looping & array.

CO3: Illustrate the basics for functions, structures, pointers and union.

CO4: Make use of the concept to perform the operations dynamic memory allocation, searching and recursion.

CO5: Examine the file processing for sequential, random access and command line arguments.

TEXT BOOKS:

1. Venugopal K. and Prabhu Raja V., “Engineering Graphics", New Age International (P) Limited, 2008.
2. Natrajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.
3. Jeyapoovan T., “Engineering Graphics", Newdelhi Vikas Publishing House, 2007.

REFERENCES:

1. Parthasarathy N. S. and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
2. Kulkarni D; Rastogi; Sarkar, “Engineering Graphics with AUTOCAD”, Newdelhi Prentice Hall of India, 2009.

CO’s-PO’s & PSO’s MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	1	2	2	-	2	-	-	-	2	-	-	2	1	2	1
CO2	2	2	2	-	2	-	-	-	2	-	-	3	2	2	1
CO3	3	3	2	-	2	-	-	-	2	-	-	2	2	2	1
CO4	2	2	2	-	3	-	-	-	2	-	-	3	2	2	1
CO5	2	3	3	-	2	-	-	-	2	-	-	2	2	3	1

Correlation levels: 1 – low 2 – medium 3 – high “-“- no correlation

U23HS101 SDG:4	HERITAGE OF TAMIL	Category : HSMC L T P C 1 0 0 1

COURSE OBJECTIVE:

1.To learn the extensive literature of classical tamil
2.To review the fine arts heritage of tamil culture
3.To realize the contribution in Indian freedom struggle

UNIT 1 LANGUAGE AND LITERATURE 3

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT 2 HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT 3 FOLK AND MARTIAL ARTS 3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT 4 THINAI CONCEPT OF TAMILS 3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT 5 CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE 3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL: 15 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Remember the extensive literature of tamil and its classical nature, musical instruments, Folk, thinai concept, Indian Freedom Struggle& Aham, Puram and Aram Concept

CO2: Remember the principles in Thirukural, Bakthi Literature Azhwars and Nayanmars , heritage of sculpture, painting and musical instruments of ancient people, victory of chozha dynasty

CO3: Understand on folk and martial arts of tamil people, Justice in Sangam Literature, Development of Modern literature in Tamil, Making of musical instruments

CO4: Understand the role of Temples in Social and Economic Life of Tamils, Ancient Cities and Ports of Sangam Age, Conquest of Cholas

CO5: Understand the Cultural Influence of Tamils over the other parts of India, contribution of tamils self-esteem movement and siddha medicine, Print History of Tamil Books

TEXT BOOKS:

1.தமிழக வரலாறு – மக்களும் பண்பாடும் – .கே. கே பிள்ளை (வெளியீடு): தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள்கழகம்

2.கணினித்தமிழ் – முனைவர் இல. சுந்தரம் . (விகடன்பிரசுரம்).

3.கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை (வெளியீடு)

REFERENCES:

1.Social Life of Tamils (Dr. K. K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2.Historical Heritage of the Tamils (Dr .S. V. Subaramanian, Dr .K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
3.The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies)
4. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
5.Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23EE101 **Category: EEC**

SDG: 17 **CAREER ENHANCEMENT TRAINING I**

L	T	P	C
1	0	2	1

COURSE OBJECTIVE:

1. To improve mathematical and analytical abilities of students, particularly in the context of comprehending engineering concepts and making data-driven decision.
2.To develop critical thinking skills including problem solving, logic, patterns, and reasoning.
3. To Comprehend and appreciate mathematical terminologies and concepts in order to understand, interpret, and represent science and technology.

UNIT 1 FUNDAMENTALS 6

Divisibility Test - Square root and Cube roots – HCF & LCM - problems on Numbers

UNIT 2 ALGEBRA 5

Simplification – Surds & Indices – Linear & Quadratic Equations

UNIT 3 BANKING ESSENTIALS 8

Average – Percentage – Profit & Loss – Simple Interest – Compound Interest

UNIT 4 TIME AND EFFICIENCY 8

Time Speed Distance – Problems on Trains – Boats & Streams – Time & Work – Pipes & Cisterns

UNIT 5 LOGICAL REASONING 3

Number & letter series – Analogy– Pattern classification – Coding & Decoding

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Exhibit a clear understanding of fundamental concepts of aptitude for engineering.
CO2: Demonstrate problem-solving skills and critical thinking abilities in the context of recruitment aptitude tests.
CO3: To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes.
CO4: Evaluate and interpret aptitude test results to identify areas of improvement and develop a personalized study plan for further enhancement.

TEXT BOOKS:

1. The Pearson Guide to Quantitative Aptitude For Competitive Examinations, Dinesh Khattar. Pearson
2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication.
3. A modern Approach to Verbal and Non-Verbal Reasoning R.s. Aggarwal

REFERENCES:

1.Quantitative Aptitude for CAT, Arun Sharma.
2.Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publication.
3. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs, Sarvesh K. Verma.
4. EffectiveCommunicationSkill,KulbhusanKumar,RSSalaria,KhannaPublishingHouse.
5.Wiley's Exam Expert Quantitative Ability for CAT, 2ed, Ashu Jain.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO 1	3	3	3	3	-	-	-	-	-	-	-	-			
CO 2	3	2	1	3	-	-	-	-	-	-	-	-			
CO 3	3	1	1	2	-	-	-	-	-	-	-	-			
CO 4	1	1	1	1	-	-	-	-	-	-	-	-			
CO 5	-	-	-	-	-	-	-	-	-	-	-	-			

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23BS111
SDG: 4 & 9

BASIC SCIENCE LABORATORY

Category: BSC

L	T	P	C
0	0	2	2

COURSE OBJECTIVE:

1. Realize the fundamental engineering ideas of matter, optics, heat, sound, and quantum theory.
2. Demonstrate a solid understanding of fundamental matter properties, Laser and Fiber optics classification, Quantum concepts and apply them successfully to solve practical engineering problems.
3. Apply the elastic modulus theory, Fiber Optic Sensors, Ultrasonics and thermal applications to integrate knowledge and problem solve at an advanced level.
4. Categorize the Elastic moduli concepts, Fiber optic lasers and Crystal structures to implement in Engineer problems in Material Science and electronics.
5. Analyse the foundational Quantum and Crystal Physics concepts to implement solutions for modern engineering problems.

PHYSICS - LIST OF EXPERIMENTS (Any 5 Experiments)

1. Determination of rigidity modulus – Torsion pendulum
2. Determination of Young's modulus - Non uniform bending method.
3. Determination of Young's modulus - Uniform bending method.
4. Determination of thickness of a thin wire – Air wedge method.
5. Determination of the wavelength of the laser using grating .
6. Determination of Numerical Aperture and acceptance angle using Optical fibre.
7. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
8. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
9. Melde's string experiment.
10. Determination of Band gap of a semiconductor.

CHEMISTRY- LIST OF EXPERIMENTS (Any 5 Experiments)

1. Estimation of total, temporary and permanent hardness of water by EDTA method.
2. Estimation of alkalinity of the given water sample.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of strength of given hydrochloride acid using pH meter
5. Determination of DO content of water sample by Winkler's method.
6. Conduct metric titration strong acid Vs Strong Base.
7. Estimation of BOD of the given water sample.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of Iron content by spectrophotometer.
10. Estimation of sodium present in water using flame photometer.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Apply Physics principles of elasticity to evaluate engineering properties of materials.

CO2: Analyze the physical principle involved in various instruments in acoustics, optics and thermal physics.

CO3: Characterize the quality of water samples with respect to their acidity, alkalinity and hardness.

CO4: Apply chemistry principles to evaluate DO, BOD, Iron content of the given samples.

CO5: Analyze the strength and amount of acids using pH, potentiometer, conductivity meter and the amount of chloride, sodium iron using Argentometric method and flame photometer for the given solution.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	3	2	1	1	-	-	1	-	1	-	-	-			
CO2	3	2	1	1	-	-	1	-	1	-	-	1			
CO3	3	2	1	1	-	-	1	-	1	-	-	-			
CO4	3	2	1	1	-	-	1	-	1	-	-	1			
CO5	3	2	-	1	-	-	1	-	1	-	-	1			

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23EN111 SDG: 4	COMMUNICATIVE ENGLISH LABORATORY	Category: HSMC L T P C 0 0 2 1

COURSE OBJECTIVE:

1. To enable learners of engineering and technology to develop their basic communication skills in English.
2. To acquire, command in both the respective skills (listening and reading) and the productive skills (writing and speaking) of the English language.
3. To understand the key concepts of values, life skills and business communication and motivate students to look within and create a better version of themselves.
4. To focus on the development of basic fluency in English, usage of vocabulary in the technical field, and strengthening reading and official written communication skills.
5. To use language efficiently in expressing their opinions via various media.

LIST OF EXPERIMENTS:

1. Conversation: Introduction to classmates-Audio/Video(formal & informal)
2. Self Introduction
3. Telephone Conversation
4. Listening to voicemail & messages
5. Listening and filling a form
6. Debate
7. Group Discussion
8. Exchanging personal Information
9. Introducing a friend politeness strategy
10. Essay Writing

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, students would
CO1: Listen and comprehend complex academic texts.
CO2: Understand the denotative and connotative meanings of technical texts.
CO3: Identify definitions, descriptions, narrations and essays on various topics.
CO4: Apply different methods of integration in solving practical problems.
CO5: Express their opinions effectively in both oral and written medium of communication.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO 1	3	2	3	1	1	1	-	-	2	-	2	2	2	2	-
CO 2	3	2	2	2	1	1	-	-	2	-	2	2	3	3	-
CO 3	3	2	3	2	1	2	-	-	2	-	2	2	2	2	-
CO 4	3	2	2	2	1	2	-	-	3	-	2	3	3	3	-
CO 5	3	2	3	1	1	2	-	-	3	-	2	3	2	3	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23GE111 SDG: 4	ENGINEERING PRACTICES LABORATORY	Category: ESC L T P C 0 0 4 2

COURSE OBJECTIVE:

1. Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common household wood work.
2. Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts.
3. Assembling simple mechanical assembly of common household equipment's; Making a tray out of metal sheet using sheet metal work.
4. Wiring various electrical joints in common household electrical wire work.
5. Soldering and testing simple electronic circuits; Assembling and testing simple electronic components.

LIST OF EXPERIMENTS:

GROUP A (CIVIL & MECHANICAL)

PART I CIVIL ENGINEERING PRACTICES:

Plumbing Work

1. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
2. Preparing plumbing line sketches.
3. Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.

Wood Work

4. Sawing
5. Plan
6. Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

PART II MECHANICAL ENGINEERING PRACTICES

Welding Work

1. Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
2. Practicing gas welding.

Basic Machining Work

1. Simple Turning
2. Simple Drilling
3. Simple Tapping

Machine Assembly Practice

1. Study of centrifugal pump
2. Study of air conditioner

Sheet Metal Work

1. Making of a Square tray

GROUP B (ELECTRICAL & ELECTRONICS)

PART I ELECTRICAL ENGINEERING PRACTICES

1. Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin sockets.
2. Staircase wiring.
3. Fluorescent Lamp wiring with introduction LED types.
4. Energy meter wiring and related calculations/ calibration
5. Study of Iron Box wiring and assembly

PART II ELECTRONIC ENGINEERING PRACTICES

1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-

peak, rms period, frequency) using CR.
2. Study of logic gates AND, OR, EX-OR and NOT.
3. Generation of Clock Signal.
4. Soldering simple electronic circuits and checking continuity.
5. Assembly and dismantle of LED TV.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Fabricate carpentry components and pipe connections including plumbing works.

CO2: Use welding equipments to join the structures.

CO3: Carry out the basic assembling and machining operations; Make the models using sheet metal works.

CO4: Carry out basic home electrical works and appliances and to measure the electrical quantities.

CO5: Soldering the simple electronic circuits; Assemble the simple electronic devices.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	2	-	-	1	1	-	-	-	-	-	2	2	1	1
CO2	3	2	-	-	1	1	-	-	-	-	-	2	2	1	1
CO3	3	2	-	-	1	1	-	-	-	-	-	2	2	1	1
CO4	3	2	-	-	1	1	-	-	-	-	-	2	2	1	1
CO5	3	2	-	-	1	1	-	-	-	-	-	2	2	1	1

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

SEMESTER II

	DESIGN OF EXPERIMENT	**Category: BSC**			
U23MA203	**AND**	**L**	**T**	**P**	**C**
SDG: 4	**NUMERICAL METHOD**	**3**	**1**	**0**	**4**

COURSE OBJECTIVE:

1. Learn basic concepts of statistical and numerical methods as well as numerical problem solving procedure for planning marketing strategies
2. Gain the knowledge of testing of hypothesis for samples and design of experiments
3. Understand the basic concepts in solving algebraic and transcendental equations
4. Adopt the numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines
5. Develop the various techniques and methods of solving ordinary differential equations

UNIT 1 **TESTING OF HYPOTHESIS** **9+3**

Large Sample Test: Single Mean and Difference of two Means. Small Sample Test - Student's t Test - Single Mean-Difference of Two Means-F Test- Chi Square Test-Goodness of Fit - Test of Independence Attributes – Application- Comparative Analysis - Quality Testing.

UNIT 2 **DESIGN OF EXPERIMENTS** **9+3**

Analysis of Variance: One way and two-way classifications - Completely randomized design – Randomized block design – Latin square design. Application: Response Surface Methodology.

UNIT 3 **ALGEBRAIC AND TRANSCENDENTAL EQUATIONS** **9+3**

Solution of algebraic and transcendental equations–Newton Raphson method - Gauss elimination method – Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel Method. Application: System of Communications.

UNIT 4 **NUMERICAL DIFFERENTIATION AND INTEGRATION** **9+3**

Interpolation Using Newton's Forward and Backward Difference Formulae – Numerical Integration(Single): Trapezoidal Rule and Simpson's 1/3rd and 3/8 Rules. Application: The determination of discontinuous points in Image processing.

UNIT 5 **SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS** **9+3**

Taylor's series method - Euler's method - Modified Euler's method – Fourth orders Runge-Kutta method for solving first order differential equations. Application: Electrical circuits, Chemical reactions and Mechanical system.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Taylor's series method - Euler's method - Modified Euler's method – Fourth orders Runge-Kutta method for solving first order differential equations. Application: Electrical circuits, Chemical reactions and Mechanical system.

CO2: Tests for single mean, Equality of variance, Chi square test for goodness of fit and Solution of linear equations.

CO3: Apply the numerical techniques of differentiation and integration for engineering problems and solving Ordinary Differential Equations.

CO4: Analyze the concepts of classifications of design of experiments and linear equations in the field of Engineering and Technology.

CO5: Solve the ordinary differential equations using certain techniques with engineering applications.

TEXT BOOKS:

1. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics forEngineers", Pearson Education, Asia, 8th Edition, 2015.

2. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.

REFERENCES:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016

2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning,New Delhi, 8th Edition, 2014

3. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand &Sons, New Delhi, 12th Edition, 2020

4. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning,New Delhi, 8th Edition, 2014

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	3	3	2	2	-	-	-	-	-	-	-	-	2.5	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-	2.75	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-	2.75	-	-

Correlation levels: **1 – low** **2 – medium** **3 – high** **"-"- no correlation**

U23PH204
SDG: 4

PHYSICS OF MATERIALS

Category: BSC

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. Make the students to have a knowledge on the basis of conducting materials, quantum mechanics and about energy bands.
2. Introduce the physics of semiconducting materials and applications of semiconductors in device fabrication.
3. Make the students to learn the origin of magnetism in magnetic materials and their classifications and also it describes the phenomena related microwaves.
4. Equip the students to learn the mechanisms of polarization in dielectric materials, and to learn the physics of superconductivity & various properties exhibited by superconductors.
5. Make the students familiarize in the new materials and it applications.

UNIT 1 ELECTRICAL PROPERTIES OF MATERIALS 9

Conducting materials: Introduction - Classical free electron theory – Electrical and thermal conductivities – Wiedemann- Franz law – Lorentz number –Merits and demerits of classical free electron theory – Quantum free electron theory-Fermi distribution function – Effect of temperature on fermi function - Density of energy states – Carrier concentration in metals - Electron effective mass.

UNIT 2 SEMICONDUCTING PROPERTIES OF MATERIALS 9

Elemental and Compound semiconductors - Intrinsic semiconductor – Carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – Electrical conductivity – Band gap determination – Derivation of carrier concentration in n-type and p-type semiconductor – Variation of Fermi level with temperature and impurity concentration — Hall effect –Determination of Hall coefficient – Applications.

UNIT 3 MAGNETIC MATERIALS AND MICROWAVES 9

Origin of magnetic moment – Bohr magneton – comparison of Dia, Para and Ferro magnetism - Ferromagnetism: saturation magnetization and Curie temperature – Domain theory – Hysteresis – Soft and hard magnetic materials –Antiferromagnetic materials – Ferrites and its applications - Microwaves: Introduction - Conversion of microwaves into heat - Penetration depth and applications.

UNIT 4 DIELECTRIC AND SUPERCONDUCTING PROPERTIES OF MATERIALS 9

Electrical susceptibility –Dielectric constant – Electronic, ionic, orientational and space charge polarization – Frequency and temperature dependence of polarisation – Internal field – Claussius – Mosotti relation (derivation) – Dielectric loss – Dielectric breakdown - Superconductivity: properties – Type I and Type II superconductors – High Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT 5 NEW MATERIALS AND APPLICATIONS 9

Metallic glasses - Melt spinning process, applications - shape memory alloys: Ni-Ti alloy, applications – Ceramics - Types and applications – Nanomaterials: Low dimensional structures: quantum dot, quantum wire and quantum well –preparation (bottom up and top down approaches) - Properties and Industrial applications of nanotechnology in food processing and packaging.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Realize the fundamental properties of classical and quantum mechanics, semiconductor physics and about its energy band, magnetic properties of materials, dielectric materials superconducting materials and the basics of new engineering materials

CO2: Demonstrate a solid understanding of classical and quantum mechanics, semiconductor physics, magnetic properties of materials, dielectric materials and superconducting materials to solve practical engineering problems.

CO3: Apply the basic theory of classical and quantum mechanics, semiconductor physics, magnetic, dielectric materials, superconducting materials to integrate knowledge to various applications.

CO4: Categorize the semiconductor, magnetic, dielectric and superconducting properties of materials and apply it to solve Engineering problems in Material Science.

CO5: Analyse the foundational knowledge of conductor, semiconductor, magnetic, dielectric and superconducting materials to implement solutions for modern engineering problems.

TEXT BOOKS:

1. Arumugam M., Materials Science. Anuradha publishers, 2010
2. Pillai S.O., Solid State Physics. New Age International(P) Ltd., publishers, 2009
3. The Physics and Chemistry of NanoSolids by Frank J. Owens and Charles P. Poole Jr, Wiley-Inter science, 2008

REFERENCE BOOKS:

1. Palanisamy P.K. Materials Science. SCITECH Publishers, 2011
2. Senthilkumar G. Engineering Physics II. VRB Publishers, 2011
3. J.F.Shackelford. Introduction to Materials Science for Engineers. Pearson, 2015

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	2	1	-	-	-	1	-	-	-	-	1	-	-	-
CO2	3	2	-	-	-	-	1	-	-	-	-	-	-	-	-
CO3	3	2	1	-	1	-	1	-	-	-	-	1	-	-	-
CO4	3	2	1	-	-	-	1	-	-	-	-	1	-	-	-
CO5	3	2	1	-	1	-	1	-	-	-	-	1	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CE201
SDG: 4

ENGINEERING MECHANICS

Category: ESC

L	T	P	C
3	2	0	3

COURSE OBJECTIVE:

1. To Learn the use scalar and vector analytical techniques for analyzing forces in Statically determinate structures.
2. To introduce the equilibrium of rigid bodies.
3. To study and understand the distributed forces, surface, loading on beam and intensity.
4. To learn the principles of friction, forces and to determine the apply the concepts of frictional forces at the contact surfaces of various engineering systems.
5. To develop basic dynamics concepts – force, momentum, work and energy.

UNIT 1 STATICS OF PARTICLES 9

Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces (Statement Only) – Vectorial representation of forces – Vector operations of forces - additions, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle – Equivalent systems of forces – Principle of transmissibility.

UNIT 2 EQUILIBRIUM OF RIGID BODIES 9

Free body diagram – Types of supports –Action and reaction forces (Beam only) – stable equilibrium – Conditions of equilibrium - Moments and Couples – Moment of a force about a point and about an axis.

UNIT 3 PROPERTIES OF SURFFACES AND SOLIDS 9

Centroids and centre of mass – Centroids sections - Rectangle, Circle, Triangle – T section, I section, - Angle section, Hollow section by using standard formula –Theorems of Pappus (Statement Only) - Area moments of inertia of plane areas – Rectangle, Circle, Triangle, T section, I section, Angle section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem (Statement Only) – Polar Moment of Inertia – Radius of Gyration.

UNIT 4 DYNAMICS OF PARTICLES 9

Introduction – Dynamics - Kinematics & Kinetics – Characteristics of Kinematics - Displacements, Velocity and acceleration, their relationship - Newton's laws of motion – Work Energy Equation– Impulse and Momentum.

UNIT 5 FRICTION 9

Friction – Types of friction – Limiting friction – Coulomb's law of dry friction – Impending Motion – Angle of Repose – Body on a Rough inclined plane – Simple Contact Friction – Ladder Friction – Screw Friction – Belt Friction.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Illustrate the vectorial and scalar representation of forces and moments

CO2: Analyse the rigid body in equilibrium

CO3: Evaluate the centre of Gravity and Moment of Inertia of an object.

CO4: Calculate dynamic forces exerted in rigid body

CO5: Determine the friction and the effects by the laws of friction

TEXT BOOKS:

1. Bhavikatti, S.S and Rajashekarappa, K.G., "Engineering Mechanics", New Age International (P) Limited Publishers, 1998

2. Rajasekaran S and Sankarasubramanian G., "Engineering Mechanics Statics and Dynamics", 3rd Edition, Vikas Publishing House Pvt. Ltd., 2005.

REFERENCE BOOKS:

1. R.S.Khurmi. "A Text Book of Engineering Mechanics, S Chand Publishing, 2019.

2. N.Kottiswaran, "Engineering Mechanics", Sri Balaji Publications, 2013.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3	3	2	1	-	-	-	-	-	-	2	3	3	2
CO2	3	3	3	2	2	-	-	-	-	-	-	2	3	3	2
CO3	3	3	2	1	1	-	-	-	-	-	-	1	3	3	2
CO4	3	3	3	2	2	-	-	-	-	-	-	1	3	3	2
CO5	3	3	3	2	2	-	-	-	-	-	-	2	3	3	2

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23HS202
SDG: 5

TAMILS AND TECHNOLOGY

Category: HSMC

L	T	P	C
1	0	0	1

COURSE OBJECTIVE:

1. To learn the extensive literature of classical Tamil.
2. To review the fine arts heritage of Tamil culture.
3. To realize the contribution in Indian freedom struggle.

UNIT 1 WEAVING AND CERAMIC TECHNOLOGY 3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT 2 DESIGN AND CONSTRUCTION TECHNOLOGY 3

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT 3 MANUFACTURING TECHNOLOGY 3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads - Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT 4 AGRICULTURE AND IRRIGATION TECHNOLOGY 3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT 5 SCIENTIFIC TAMIL & TAMIL COMPUTING 3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

TOTAL: 15 PERIODS

COURSE OUTCOMES:

CO1: Understand the extensive literature of Tamil and its classical nature (understand)

CO2: Understand the heritage of sculpture, painting and musical instruments of ancient people (understand)

CO3: Review on folk and martial arts of Tamil people (understand)

CO4: Realization of thinai concepts, trade and victory of chozha dynasty (understand)

CO5: Understand the contribution of Tamils in Indian freedom struggle, self-esteem movement and siddha medicine (understand)

TEXT BOOKS:

1.தமிழகவரலாறு – மக்களும்பண்பாடும் – . கே. கேபிள்ளை (வெளியீடு): தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்

2.கணினித்தமிழ் – முனைவர்இல. சுந்தரம் . (விகடன்பிரசுரம்).

REFERENCE BOOKS:

1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23EN202
SDG: 4

PROFICIENCY IN ENGLISH

Category: HSMC

L	T	P	C
2	0	2	3

COURSE OBJECTIVE:

1. To engage learners in meaningful language activities to improve their LSRW skills.
2. To identify personality traits and evolve as a better team player.
3. To develop analytical thinking skills for problem solving in communicative contexts.
4. To demonstrate an understanding of job applications and interviews for internship andplacements.
5. To identify varied group discussion skills and apply them to take part in effective discussions in a professional context.

UNIT 1 MAKING COMPARISONS 9

Listening – Listening to informal conversations (Activity)
Speaking – Role Play - talking about experiences- talking about events in life- discussing past events
Reading - Reading advertisements, Extensive Reading (Activity)
Writing – Reading Comprehension, Writing a review/ summary of story/article.
Grammar – Active voice & Passive voice, Prepositional phrases.

UNIT 2 EXPRESSING CASUAL RELATIONS IN SPEAKING AND WRITING 9

Listening - Listening to longer technical speech, Listening to situation based dialogues
Speaking – discussing news stories -talking about travel problems and procedures
Reading - Reading longer technical texts, Reading a short story
Writing - Personal letter (Inviting your friend), Congratulating letter, Writing responses to complaints and adjustment letter. Grammar - Infinitive and Gerunds, Modals

UNIT 3 PROBLEM SOLVING 9

Listening – Listening to movie scenes/ documentaries depicting a technical problem and suggesting solutions (Activity).Speaking – Conversation skills with a sense of stress, intonation, pronunciation, Welcome address - vote of thanksReading - Case Studies, news reports, reading passages with time limit. Writing – Letter to the Editor, Short report on an event (field trip).Grammar -– If conditional sentence, Phrasal Verbs

UNIT 4 REPORTING OF EVENTS AND RESEARCH 9

Listening – Listening Comprehension based on news reports. Speaking – Presenting an oral report, Talking about past, present and the future (Activity).Reading – Newspaper articles; Reading the job advertisements and the profile of the company. Writing – Essay writing and its types (Compare & Contrast, Cause & Effect, Problem & Solution). Grammar – Reported Speech, Conjunctions

UNIT 5 THE ABILITY TO PUT IDEAS OR INFORMATION TO COGENTLY 9

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Identify cause and effects in events, industrial processes through technical text

CO2: Understand and use tools of structured written communication

CO3: Identify individual personality types and role in a team

CO4: Understand the basics concepts of morality and diversity

CO5: Present their opinion in a planned and logical manner, and draft effective resumes in context of job search.

TEXT BOOKS:

1. English for Engineers & Technologists, Orient Blackswan Private Ltd. Department of English, Anna University, 2020

2. Barun.K.Mithra, Personality Development and Soft Skills, OUP India, 2019

REFERENCE BOOKS:

1. Jack C. Richards, "Interchange, Student's Book", 4th Edition, Cambridge University Press, New York, 2017.

2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	1	1	-	3	1	-	2	-	-	-
CO2	-	-	-	-	-	1	1	-	3	2	-	2	-	-	-
CO3	-	-	-	-	-	1	1	-	3	2	-	3	-	-	-
CO4	-	-	-	-	-	1	1	-	3	1	-	2	-	-	-
CO5	-	-	-	-	-	1	1	-	3	3	-	3	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CE202	BUILDING MATERIALS	L	T	P	C
		3	0	0	3

PRE REQUISITES: -

COURSE OBJECTIVES:

1.	To introduce students to various materials commonly used in civil engineering construction and their properties.

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1:	Compare the properties of most common and advanced building materials.
CO2:	Understand the typical and potential applications of lime, cement and aggregates.
CO3:	Know the production of concrete and also the method of placing and making of concrete elements.
CO4:	Understand the applications of timbers and other materials.
CO5:	Understand the importance of modern material for construction.

CO-PO MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	3	2	2	3	1	1	1	2	1	2	3	3	3	2
2	3	2	3	2	3	1	1	1	2	1	2	3	2	2	3
3	3	3	2	2	2	2	1	1	2	1	2	3	2	2	3
4	2	3	3	2	2	1	1	1	1	1	2	3	2	2	3
5	3	3	2	2	2	1	1	1	1	1	1	3	2	3	2
Avg.	**3**	**3**	**2**	**2**	**2**	**1**	**1**	**1**	**2**	**1**	**2**	**3**	**2**	**2**	**3**

1 – Low, 2 – Moderate, 3 – High

SYLLABUS

UNIT	TITLE	PERIODS
I	**INTRODUCTION TO CONSTRUCTION MATERIAL**	9
	Basic Material for construction - Stone as building material – Criteria for selection – Tests on stones – Deterioration and Preservation of stone work – Bricks – Classification – Manufacturing of clay bricks – Tests on bricks – Compressive Strength – Water Absorption – Efflorescence – Bricks for special use.	
II	**LIME – CEMENT – AGGREGATES**	9
	Lime – Preparation of lime mortar – Cement – Ingredients – Manufacturing process – Types and Grades – Properties of cement and Cement mortar – Hydration – Compressive strength – Tensile strength – Fineness– Soundness and consistency – Setting time – fine aggregates – river sand – crushed stone sand – properties – coarse Aggregates – Crushing strength – Impact strength – Flakiness Index – Elongation Index – Abrasion Resistance – Grading.	
III	**CONCRETE**	9
	Concrete – Ingredients – Manufacturing Process – Batching plants –mixing – transporting – placing – compaction of concrete –curing and finishing – Ready mix Concrete – Mix specification - Concrete blocks – Lightweight concrete blocks – Introduction to Admixture.	
IV	**TIMBER AND OTHER MATERIALS**	9
	Timber – Market forms – Industrial timber – Plywood – Veneer – Thermocol – Panels of laminates – Steel – Aluminum and Other Metallic Materials – Composition – Aluminium composite panel – Market forms – Mechanical treatment – Paints – Varnishes – Distempers – Bitumens and Tar.	
V	**SUSTAINABLE MATERIALS**	9
	Glass – Ceramics – Sealants for joints – Fibre glass reinforced plastic – Clay products – Refractories – Bamboo - Tyre – Composite materials – Types – laminar composites – Fibre textiles– Geomembranes and Geotextiles for earth reinforcement – Application of Green Building Material	

Contact Periods:

Lecture: 45	**Tutorial:-**	**Practical: -**	**Project: -**
		TOTAL PERIODS:	**45**

TEXT BOOKS:	
1.	Varghese.P.C, "Building Materials", PHI Learning Pvt. Ltd, New Delhi, 2015.
2.	Rajput. R.K., "Engineering Materials", S. Chand and Company Ltd., 2008.
3.	Gambhir.M.L., "Concrete Technology", 3rd Edition, Tata McGraw Hill Education, 2004.
4.	Duggal.S.K., "Building Materials", 4th Edition, New Age International, 2008.

REFERENCE BOOKS:	
5.	Jagadish.K.S, "Alternative Building Materials Technology", New Age International, 2007.
6.	Gambhir. M.L., & Neha Jamwal., "Building Materials, products, properties and systems", Tata McGraw Hill Educations Pvt. Ltd, New Delhi, 2012.
7.	IS456 - 2000: Indian Standard specification for plain and reinforced concrete, 2011
8.	Punmia, B.C., "Soil Mechanics and Foundations", Laxmi Publications Pvt. Ltd. New Delhi, 2005.

EVALUATION PATTERN.

<table>
<tr><td colspan="4">Continuous Internal Assessments</td><td rowspan="3">Total Internal Assessments</td><td rowspan="3">End Semester Examinations</td></tr>
<tr><td colspan="2">Assessment I(100Marks)</td><td colspan="2">Assessment II(100Marks)</td></tr>
<tr><td>Individual Assignment /Case Study/Seminar/Mini Project</td><td>Written Test</td><td>Individual Assignment/ Case Study/ Seminar/Mini Project</td><td>Written Test</td></tr>
<tr><td>40</td><td>60</td><td>40</td><td>60</td><td>200</td><td>100</td></tr>
<tr><td colspan="4" rowspan="2">Total</td><td>40</td><td>60</td></tr>
<tr><td colspan="2">100</td></tr>
</table>

U23CS203
SDG: 4

C PROGRAMMING

Category: ESC

L	T	P	C
2	0	2	3

COURSE OBJECTIVE:

1. To learn the basic constructs of C Programming.
2. To learn arrays and strings concepts of C Programming
3. To learn functions and pointers in C and use pointers for storing data in the main memory efficiently.
4. To learn structures and union concepts of C Programming.
5. To learn Applications of C programs.

UNIT 1 BASICS OF C PROGRAMMING 6

Structure of a 'C' program - C Tokens: Constants, Variables – Data Types: Primitive Data Types, Type Definition, Operators and Expressions- Managing Input and Output operations

UNIT 2 CONTROL STATEMENTS AND ARRAYS 6

Decision Making: Branching statements, Looping statements- Arrays: Declaration, Initialization, One dimensional, Two dimensional, and Multidimensional arrays

UNIT 3 STRINGS, FUNCTIONS AND POINTERS 6

String: String operations – Function: Declaration, Definition, Parameter passing methods, Recursion – Pointers: Declaration, Definition, Pointers and Functions

UNIT 4 STRUCTURE AND UNION 6

Structure and union - Nested structures – Pointer and Structures – Array of structures – Example Program using structures and pointers.

UNIT 5 APPLICATION OF C PROGRAMMING 6

Applications – Advantages of C in civil Engineering – Analysis and Simulations of Design using C programming – Data Processing - Implementation of C in Design- Case Studies.

LIST OF EXPERIMENTS

1. Programs using simple statements
2. Programs using decision making statements
3. Programs using looping statements
4. Programs using one dimensional and two-dimensional arrays
5. Programs using strings.
6. Programs using user defined functions and recursive functions
7. Programs using functions and pointers
8. Sort the list of numbers using pass by reference.
9. Generate salary slip of employees using structures and pointers
10. Case Studies on Applications of C program in Civil Engineering Design

TOTAL = 30+15 =45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Develop simple applications in C using basic constructs

CO2: Design applications using control statements and arrays

CO3: Develop and implement applications in C using functions and pointers and use pointers for storing data in the main memory efficiently.

CO4: Develop applications in C using structures and union.

CO5: Design Applications using C programming in Civil engineering

TEXT BOOKS:

1. Reema Thareja, "Programming in C", Oxford University Press, Second edition, 2016

2. Beecher K. Computational Thinking: A beginner's guide to Problem-solving and Programming. BCS Learning & Development Limited;2017.

REFERENCE BOOKS:

1. Byron Gottfried. Programming With C. Fourth Edition, McGrawHill, 2018.

2. Paul Deital , Harvey deital, "C How to Program" , 8th Edition , Pearson,2016

3. Yashavant P. Kanetkar. "Let Us C", BPB Publications, 2016.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3	-	-	-	-	-	-	1	-	-	-	1	-	-
CO2	3	3	3	-	-	-	-	2	1	-	-	-	1	-	-
CO3	3	3	1	1	-	-	-	2	1	-	-	-	1	-	-
CO4	2	3	3	2	2	-	2	-	1	-	-	-	-	-	-
CO5	2	3	3	2	-	-	-	-	-	-	-	-	1	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CE211 SDG: 9	COMPUTER AIDED BUILDING DRAWING LABORATORY	Category: PCC

L	T	P	C
0	0	4	2

COURSE OBJECTIVE:

1. To Develop Skill to use Software to Create 2D and 3D Models
2. To apply basic concept to drawing, edit, dimension, hatching etc. to develop 2D & 3D Modeling.
3. To make 3D modeling, along with detailing.

LIST OF EXPERIMENTS:

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involutes using Bspline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V- block, Base of a mix, Simple stool, Objects with hole and curves).
6. Drawing sectional views of prism, pyramid, cylinder, cone, etc
7. Drawing isometric projection of simple objects.
8. Drawing of a simple steel truss.
9. Drawing of a plan of residential building (Two bed rooms, kitchen, hall, etc.)
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

TOTAL = 30 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Able to choose scale factor and drawing standards

CO2: Ability to use the software packers for drafting and modeling

CO3: Ability to create 2D and 3D models of Engineering Components

CO4: Draw the various building components and also other structural Components.

CO5: Develop the working Drawings and recommend the details as per local bye laws.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	-	3	-	2	3	1	1	3	-	-	1	3	2	-
CO2	3	2	3	-	2	3	1	2	3	2	-	1	3	2	2
CO3	3	2	3	-	2	3	2	2	3	2	2	3	3	2	2
CO4	3	2	3	2	2	3	2	1	3	2	2	3	3	2	2
CO5	3	2	3	2	2	3	2	2	3	2	2	3	3	2	2

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23EE202 SDG: 10	CAREER ENHANCEMENT TRAINING II	Category: EEC L T P C 3 0 0 1

COURSE OBJECTIVES:

1. To help students demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
2. To enable students critically evaluate various real-life situations by resorting to an analysis of key issues and factors.
3. To help them improve their communicative English for Interview and corporate readiness

LIST OF EXPERIMENTS:

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involutes using Bspline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V- block, Base of a mix, Simple stool, Objects with hole and curves).
6. Drawing sectional views of prism, pyramid, cylinder, cone, etc
7. Drawing isometric projection of simple objects.
8. Drawing of a simple steel truss.
9. Drawing of a plan of residential building (Two bed rooms, kitchen, hall, etc.)
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

TOTAL = 30 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Demonstrate problem-solving skills and critical thinking abilities in the context of Engineering Aptitude

CO2: To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes.

CO3: Evaluate and interpret aptitude test results to identify areas of improvement and develop a personalized study plan for further enhancement.

CO4: Use the correct Grammar, Vocabulary, Spelling and Comprehension ensuring the enhancement their language skills and the ability to use the skills for effective Communication

CO5: To improve the Communication skills for the self-introduce in the Interview.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3	3	3	-	-	-	-	-	1	-	-	-	-	-
CO2	3	2	1	3	-	-	-	-	-	1	-	-	-	-	-
CO3	3	1	1	2	-	-	-	-	-	1	-	-	-	-	-
CO4	1	1	1	1	-	-	-	-	-	3	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23MA307 SDG: 7	TRANSFORM TECHNIQUES AND PARTIAL DIFFERENTIAL EQUATIONS (AERO AND CIVIL)	Category : BSC			
		L	T	P	C
		3	1	0	4

COURSE OBJECTIVE:

- To impart knowledge on partial differential equations.
- To construct Fourier series for different periodic functions and to evaluate infinite series.
- To classify different types of PDE and solve boundary value problems.
- To acquaint the student with different transform techniques used in wide variety of situations.
- To solve difference equations using Z – transforms that arise in discrete time systems.

UNIT 1 PARTIAL DIFFERENTIAL EQUATIONS 9+3

Solution of first order partial differential equations: Lagrange's linear equation— Method of Grouping and Multipliers. Solutions of second order partial differential equation with constant coefficients of homogeneous function

UNIT 2 FOURIER SERIES 9 + 3

Dirichlet's conditions — General Fourier series — Problems under the interval (0, 2π) — Odd and even functions — Half range sine and cosine series — Problems under the interval (0, π) — Harmonic analysis. Application: Modeling of vibrating membrane using Fourier series

UNIT 3 APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS 9 + 3

Classification of PDE — Fourier series solutions of one-dimensional wave equation —One dimensional equation of heat conduction with zero boundary values, steady state conditions and zero boundary conditions —Application: Wave propagation in cylinders

UNIT 4 FOURIER TRANSFORMS 9 + 3

Fourier Transform, Statement of Fourier integral theorem (without proof) – Fourier transform pair –Inverse Fourier transform —Transforms of simple functions– Parseval's identity. Application: Medical Imaging

UNIT 5 Z TRANSFORMS 9 + 3

Z-transforms of some basic functions— Elementary properties — Inverse Z-transform by partial fraction method - Inverse Z-transform by Convolution method — solution of difference equations. Application: Image analysis

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able to:

CO1: State and define differential equations using Fourier series analysis and Steady state solution, Transform of simple functions which plays a vital role in Engineering applications.

CO2: Understand how to solve the given standard partial differential equations, Odd and Even functions using Fourier series, Classification of PDE, Fourier transform pair and Elementary properties using Z – Transforms

CO3: Apply the physical significance of Fourier series techniques in solving one dimensional heat flow problems and onedimensional wave equations, Appreciate the same in solving Convolution theorem by Transforms

CO4: Analyze the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.

CO5: Apply the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems and Steady state solutions and Harmonic Analysis.

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, New Delhi, 2018.
2. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2018.
3. Kreyszig E, "Advanced Engineering Mathematics ", 10th Edition, John Wiley, New Delhi, India, 2018.

REFERENCES:

1. Andrews. L.C and Shivamoggi. B, "Integral Transforms for Engineers" SPIE Press, 1999.
2. James. G., "Advanced Modern Engineering Mathematics", 4thEdition, Pearson Education, New Delhi, 2016.
3. Wylie. R.C. and Barrett . L.C., "Advanced Engineering Mathematics "Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012
4. Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 10th Edition, Laxmi Publications Pvt. Ltd, 2021.
5. Narayanan. S.ManicavachagomPillay.T.K and Ramanaiah.G "Advanced Mathematics for Engineering Students", Vol. II & III, S.Viswanathan Publishers Pvt. Ltd, Chennai, 1998.

CO's-PO's & PSO's MAPPING														
CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
CO1	3	2	1	-	-	-	-	-	1	-	-	1	-	-	-
CO2	3	2	1	-	-	-	-	-	1	-	-	1	-	-	-
CO3	3	3	2	-	-	-	-	-	1	-	-	1	-	-	-
CO4	3	2	3	-	-	-	-	-	1	-	-	1	-	-	-
CO5	3	3	1	-	-	-	-	-	1	-	-	1	-	-	-
Correlation levels:			**1 – low**			**2 – medium**			**3 – high**			**"-"- no correlation**			

U23CE321	STRENGTH OF MATERIALS	L	T	P	C
		3	1	0	4

PREREQUISITES:
Engineering Physics, Engineering Mechanics

COURSE OBJECTIVES:	
1.	To learn the fundamental concepts of Stress in simple and complex states.
2.	To know the mechanism of load transfer in beams.
3.	To understand the induced stresses due to simple bending and unsymmetrical bending.
4.	To determine the deformation in determinate beams.
5.	To know the basic concepts of analysis of indeterminate beams.

COURSE OUTCOMES:	
Upon completion of this course, student will be able to:	
CO1:	Understand the concepts of stress and strain, principal stresses and principal planes.
CO2:	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
CO3:	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
CO4:	Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.
CO5:	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure.

CO-PO MAPPING

CO	PO											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	1	1	2	-	1	-	-	-	3
2	3	2	3	1	1	2	-	1	-	-	-	3
3	3	2	2	1	1	1	-	1	-	-	-	3
4	3	2	3	1	1	1	-	1	-	-	-	3
5	3	2	3	1	1	2	-	2	-	-	-	3

SYLLABUS:

UNIT	SIMPLE AND COMPOUND STRESSES	PERIODS
I		9
	Stresses in simple and compound bars – Thermal stresses – Elastic constants - Thin cylindrical and spherical shells – Biaxial state of stress – Principal stresses and principal planes – Mohr's circle of stresses - Torsion on circular shafts.	
UNIT	BENDING OF BEAMS	PERIODS
II		9
	Types of beams and transverse loadings– Shear force and bending moment for simply supported, cantilever and over-hanging beams - Theory of simple bending – Bending stress distribution – Shear stress distribution.	
UNIT	DEFLECTION OF BEAMS	PERIODS
III		9
	Double Integration method – Macaulay's method – Area moment method – Conjugate beam method - Strain energy method for determinate beams.	
UNIT	INDETERMINATE BEAMS	PERIODS
IV		9
	Propped Cantilever and Fixed Beams – Fixed end moments reactions, slope and deflection for standard cases of loading –– Continuous beams – support reactions and moments – Theorem of three moments – Shear Force and Bending Moment Diagrams.	
UNIT	UNSYMMETRICAL BEAMS	PERIODS
V		9
	Unsymmetrical bending of beams - shear centerapplied - Thick cylinders - Theories of failure – Principal stress, principal strain, shear stress, strain energy and distortion energy theories – application problems.	

Contact Periods:

Lecture: 45	Tutorial:0	Practical:0	Project:0	
			TOTAL PERIODS:	45

TEXT BOOKS:	
1.	Rajput R.K. "Strength of Materials (Mechanics of Solids)", S.Chand & company Ltd., New Delhi, 2018.
2.	Punmia B.C., Ashok Kumar Jain and Arun Kumar Jain,"Theory of Structures" (SMTS) Vol -II, Laxmi Publishing Pvt Ltd, New Delhi 2017.
3.	Rattan.S.S., "Strength of Materials", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2017.

REFERENCE BOOKS:	
1.	Kazimi S.M.A, “Solid Mechanics”, Tata McGraw-Hill Publishing Co., New Delhi, 2017
2.	William A .Nash, “Theory and Problems of Strength of Materials”, Schaum’s Outline Series,Tata McGraw Hill Publishing company, 2017.
3.	Singh. D.K., “ Strength of Materials”, Ane Books Pvt. Ltd., New Delhi, 2021

EVALUATION PATTERN.

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<tr><td colspan="2">100</td></tr>
</table>

U23CE322 SDG:	CONCRETE TECHNOLOGY	Category : PCC L	T	P	C
		3	0	0	3

COURSE OBJECTIVE:

1. To study the properties of concrete making materials.
2. To have better knowledge about the chemical and mineral admixtures in concrete.
3. To familiarize with the IS method of mix design as per the latest code.
4. To understand the fresh and hardened properties of concrete.
5. To know the importance and applications of special concretes

UNIT 1 CONSTITUENT MATERIALS 9

Cement-Different types-Chemical composition and Properties -Tests on cement-IS Specifications-Aggregates-Classification-Mechanical properties and tests as per BIS Grading requirements-Water- Quality of water for use in concrete**.**

UNIT 2 CHEMICAL AND MINERAL ADMIXTURES 9

Accelerators-Retarders- Plasticizers- Super plasticizers-Water proofers - Mineral Admixtures like Fly Ash, Silica Fume, Ground Granulated Blast Furnace Slag and Metakaoline -Their effects on concrete properties

UNIT 3 PROPORTIONING OF CONCRETE MIX 9

Principles of Mix Proportioning-Properties of concrete related to Mix Design-Physical properties of materials required for Mix Design - Design Mix and Nominal Mix-BIS Method of Mix Design - Mix Design Examples

UNIT 4 FRESH AND HARDENED PROPERTIES OF CONCRETE 9

Workability-Tests for workability of concrete-Slump Test and Compacting factor Test-Segregation and Bleeding-Determination of Compressive and Flexural strength as per BIS - Properties of Hardened concrete-Stress-strain curve for concrete-Determination of Modulus of elasticity.

UNIT 5 SPECIAL CONCRETES 9

Light weight concretes - High strength concrete - Fibre reinforced concrete – Ferrocement - Ready mix concrete - SIFCON - Shotcrete – Polymer concrete - High performance concrete- self compacting concrete - Geopolymer Concrete.

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Understand the requirements of cement, aggregates and water for concrete
CO2: Select suitable admixtures for enhancing the properties of concrete
CO3: Design concrete mixes as per IS method of mix design
CO4: Determine the properties of concrete at fresh and hardened state.
CO5: Determine the properties of special concretes

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Gupta.B.L., Amit Gupta, "Concrete Technology", Jain Book Agency, 2010.
2. Shetty,M.S, "Concrete Technology", S.Chand and Company Ltd, New Delhi, 2003

REFERENCES:

1. Neville, A.M; "Properties of Concrete", Pitman Publishing Limited, London,1995
2. Gambhir.M.L.Concrete Technology,Fifth Edition, McGraw Hill Education,2017.
3. Job Thomas., Concrete Technology, Cencage learning India Private Ltd, New Delhi, 2015.
4. IS10262-2019 Recommended Guidelines for Concrete Mix Design, Bureau of Indian Standards, New Delhi.

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	1	1	2	1	3	3	2	1	1	1	2	3	2	3
CO2	3	1	1	1	1	3	3	1	1	1	1	2	3	2	3
CO3	3	2	3	3	1	3	3	1	1	1	1	2	3	2	3
CO4	3	1	1	1	1	3	3	2	1	1	2	2	3	2	3
CO5	3	1	1	1	1	3	3	2	1	1	1	2	3	2	3

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CE323 **SURVEYING AND LEVELLING**

SDG: 9

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1.To understand basic principle and concepts of different surveying methods.
2.To study the different surveying equipment in the field of civil engineering.
3.To enhance the ability to calculate surveying quantities.
4.To enable the suitability of surveying instruments and method to a given problem.
5. To imparts the knowledge on modern surveying instruments

UNIT 1 **INTRODUCTION AND CHAIN SURVEYING** **9**

Definition and Principles of Surveying–Applications-Classification–Field and Office work–Scales–Conventional Signs. Chain Survey-Instruments–Ranging –Types-Obstacles in Chaining–Chain and Tape corrections-Setting out Perpendiculars–Well conditioned Triangles–Traversing–Enlarging and reducing Maps – Topological maps.

UNIT 2 **COMPASS SURVEYING AND PLANE TABLE SURVEYING** **9**

Prismatic Compass– Surveyor's Compass – Working and use of compass - Bearing – Systems and Conversions–Computation of angles from bearing – Local Attraction -Magnetic Declination –Dip–Traversing–Adjustmentoferror.PlaneTableandAccessories–Radiation,Intersection,Resection–Two point problem-Three poin tproblem.

UNIT 3 **LEVELLING AND APPLICATIONS** **9**

Basic Terms- Types of Level– Fundamental Axes-Levelling staff– Bench Marks–Temporary and Permanent Adjustments–Types of Levelling - Curvature and Refraction correction- Reciprocal Levelling – Calculation of Areas and Volumes –Contouring–Characteristics and Uses of Contours – Methods of contouring.

UNIT 4 **THEODOLITE SURVEYING** **9**

Theodolite –types – Terms - Temporary and Permanent Adjustments – Measurement of Horizontal Angles by Repetition and Reiteration– Closing Error and Distribution – Omitted Measurements.

UNIT 5 **MODERN SURVEYING** **9**

Total Station: Digital Theodolite, EDM, Electronic field book – Advantages – Parts and accessories – Working principle – Observables – Errors - COGO functions – Field procedure and applications.GPS: Advantages – System components – Signal structure-Selective availability and antispoofing receiver components and antenna-Planning and data acquisition-Data Processing-Error in GPS-Field Procedure and applications

TOTAL:45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would
CO1: Able to calculate distances, angles.
CO2: Able to understand about compass and plane table.
CO3: Able to interpret survey data and compute areas and volumes.
CO4: Able to calculate levels of various points.
CO5: Able to know about setting out of curves.

TEXT BOOKS:

1.Kanetkar .T.P,and Kulkarni .S.V, "Surveying and Levelling, Vol.I&II",Pune Vidyarthi Griha Prakashan ,2004.
2.DuggalS.K."Surveying,Vol.I&II",Tata Mc Graw-Hill, Publishing Company,2004.
3.BasakN.N,"Surveying and Leveling",TataMcGraw-Hill,PublishingCompany,2014.
4.BhavikattiS.S,"Surveying and Leveling,Vol.I",I.K .International Pvt.Ltd.,2010.

REFERENCES:

1.Charles D Ghilani,Paul R Wolf.,ElementarySurveying,PrenticeHall,2012.
2.Bannister.A & Reynolds.S,"Surveying",ELBS,1992.
3.Chandra A.M.,"Plane Surveying",New Age International Pvt.Ltd,2015.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	3	2	-	1	-	-	-	-	2	-	-	-	-	-	-
CO2	1	-	-	2	-	-	-	-	1	-	-	-	-	1	-
CO3	-	2	-	-	-	-	-	-	3	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	1	-	-	2	-
CO5	1	-	-	2	-	-	-	-	-	-	-	-	1	-	-

Correlationlevels: 1– low 2 – medium 3– high "-"-no correlation

U23CE304
SDG:4,9

ENGINEERING GEOLOGY

Category:PCC

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1.At the end of this course the students will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and to apply this knowledge in projects such as dams, tunnels, bridges, roads, airport and harbour as well as to choose types of foundations.

UNIT 1 PHYSICALGEOLOGY 9

Geology in civil engineering – branches of geology – structure of earth and its composition – weathering of rocks–scale of weathering–soils-landforms and processes associated with river, wind, ground water and sea–relevance to civil engineering. Plate tectonics–Earthquakes–Seismic zones in India.

UNIT 2 MINERALOGY 9

Physical properties of minerals–Quartz group, Feldspar group, Pyroxene- hypersthene and augite, Amphibole – hornblende, Mica – muscovite and biotite, Calcite, Gypsumand Clayminerals.

UNIT 3 PETROLOGY 9

Classification of rocks, distinction between Igneous, Sedimentary andMetamorphic rocks.Engineering properties of rocks. Description, occurrence, engineering properties, distribution and uses of Granite, Dolerite,Basalt, Sandstone,Limestone,Laterite, Shale, Quartzite, Marble,Slate, Gneiss and Schist.

UNIT 4 STRUCTURAL GEOLOGY ANDGEOPHYSICAL METHODS 9

Geological maps–attitude of beds, study of structures–folds,faults and joints–relevance to civil engineering. Geophysicalmethods– Seismic and electrical methods forsubsurfaceinvestigations.

UNIT 5 APPLICATION OF GEOLOGICAL INVESTIGATIONS 9

Remote sensing for civil engineering applications; Geological conditions necessary for design and constructionof Dams,Reservoirs,Tunnels,andRoadcuttings–Hydrogeologicalinvestigationsand mining-Coastal protection structures.Investigation ofLandslides, causesand mitigation.

COURSE OUTCOMES:

At the end ofthe course,students would

CO1: The students can able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.

CO2: Will get basics knowledgeon properties ofminerals.

CO3: Gain knowledge about types of rocks, their distribution and uses.

CO4: Will understand the methods of study on geological structure.

CO5: Will understand the application of geological investigation in projects such as dams,tunnels, bridges,roads, airport and harbour.

TOTAL:45 PERIODS

TEXT BOOKS:

1.Varghese,P.C.,Engineering Geology for Civil Engineering Prentice Hall of India Learning Private Limited, NewDelhi, 2012.

2. Venkat Reddy. D. Engineering Geology, Vikas Publishing House Pvt. Lt, 2010.

3. GokhaleKVGK,"Principles ofEngineering Geology", B.S. Publications, Hyderabad 2011.

4. Chenna Kesavulu N."Textbook ofEngineering Geology", MacmillanIndiaLtd., 2009.

REFERENCES:

1. BlythF.G.H.and de Freitas M.H., GeologyforEngineers, Edward Arnold,London, 2010.

2.Bell .F.G."Fundamentals ofEngineeringGeology",B.S. Publications. Hyderabad 2011.

3. Dobrin, M.B "An introduction to geophysical prospecting", McGraw Hill, New Delhi, 1988

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	-	1	-	2	-	-	3	-	1	1
CO2	-	-	-	-	-	-	2	-	3	-	-	2	-	1	1
CO3	-	-	-	-	-	-	2	-	3	2	-	3	-	1	1
CO4	-	-	-	-	-	-	2	-	2	1	-	2	-	1	2
CO5	-	-	-	-	-	-	2	-	3	2	-	3	-	1	2
Correlation levels:	**1– low**			**2 – medium**				**3– high**		**"-"-no correlation**					